4.3.2.4 Water Resources

The construction and operation of a Pu conversion facility would affect water resources. Water resource requirements and discharges provided in Tables C.1.1.2–2, C.2.1.2–2, and E.3.2.2–1 were used to assess impacts to surface and groundwater. The discussion of impacts are provided for each site separately. Table 4.3.2.4–1 presents No Action surface and groundwater uses and discharges at each site, and the potential changes resulting from construction and operation of the Pu conversion facility.

Hanford Site

Surface Water. Surface water from the Columbia River would be used as the water source for construction and operation of the Pu conversion facility. During construction, water requirements would be approximately 2.4 million l/yr (0.6 million gal/yr), which would represent a 0.02-percent increase over the existing annual surface water withdrawal. This additional withdrawal would be negligible. During operation, water requirements would be approximately 80.5 million l/yr (21.2 million gal/yr), which would represent a 0.6-percent increase over the existing surface water withdrawal. This additional withdrawal would also be negligible.

[Text deleted.]

During construction of the Pu conversion facility, sanitary and other nonhazardous wastewater (2.4 million l/yr [0.6 million gal/yr]), would be generated and discharged to the existing wastewater treatment systems at the 200 Area. The effluents from this facility would be discharged to evaporation/infiltration ponds. During operation, approximately 15 million l/yr (4 million gal/yr) of sanitary and other wastewater would be discharged to this wastewater treatment system. This would represent a 6.1-percent increase in the wastewater discharged at Hanford. All discharges would be monitored to comply with discharge limits. No impacts to surface water are expected.

The Pu conversion facility would be located in the 200 Area which is above the 100-year, 500-year, and probable maximum flood boundaries; flooding from dam failures; and flooding from a landslide resulting in river blockage.

Groundwater. No groundwater would be used during construction or operation of the Pu conversion facility; therefore, there would be no impacts to groundwater availability. No wastewater would be discharged directly to groundwater; therefore, groundwater quality should not be affected. Treated wastewater discharged to evaporation/infiltration ponds that does not evaporate, however, could percolate downward into the groundwater. This water would be monitored before discharge to the ponds and would not be discharged until contaminant levels are within the limits specified. Impacts to groundwater quality are therefore not expected. In addition, other factors contributing to a lessening of potential impacts to groundwater are the combined effects of a deep water table, low discharge volumes, and high evaporation rates.

Nevada Test Site

Surface Water. No surface water would be withdrawn for any construction or operation activities associated with any of the proposed facilities; groundwater would be used as the water source for the Pu conversion facility. Therefore, there should be no impacts to surface water availability.

[Text deleted.]

During construction of the Pu conversion facility, sanitary wastewater (2.4 million l/yr [0.6 million gal/yr]), would be generated. During operation, a maximum of approximately 15 million l/yr (4 million gal/yr) of

Table 4.3.2.4–1. Potential Changes to Water Resources Resulting From the Plutonium Conversion Facility

Affected Resource Indicator	Hanford	NTS	INEL	Pantex	ORR	SRS
Water Source	Surface	Ground	Ground	Ground	Surface	Ground
No Action water requirements (million l/yr)	13,511	2,400	7,570	249	14,760	13,247
No Action wastewater discharge (million l/yr)	246	82	540	141	2,277	700
Construction						
Water Availability and Use						
Total water requirement (million l/yr)	2.4	2.4	2.4	2.4	2.4	2.4
Percent increase in projected water use[a]	0.02	0.1	0.03	1.0	0.02	0.02
Water Quality						
Total wastewater discharge (million l/yr)	2.4	2.4	2.4	2.4	2.4	2.4
Percent change in wastewater discharge[b]	1.0	2.9	0.4	1.7	0.1	0.3
Percent change in streamflow	neg	NA	NA	NA	0.005[c]	0.05[d]
Operation						
Water Availability and Use						
Total water requirement (million l/yr)	80.5	80.5	80.5	80.5	80.5	80.5
Percent increase in projected water use[e]	0.6	3.4	1.1	32.3	0.6	0.6
Water Quality						
Total wastewater discharge (million l/yr)	15	15	15	15	15	15
Percent change in wastewater discharge[f]	6.1	18.2	2.8	10.6	0.7	2.1
Percent change in streamflow	neg	NA	NA	NA	0.03[c]	0.3[d]

Table 4.3.2.4–1. Potential Changes to Water Resources Resulting From the Plutonium Conversion Facility—Continued

Affected Resource Indicator	Hanford	NTS	INEL	Pantex	ORR	SRS
Floodplain						
Is action in 100-year floodplain?	No	No	No	No	No	No
Is critical action in 500-year floodplain?	No	Uncertain	Uncertain	No	No	Unlikely

[a] Percent increases in water requirements during construction of a Pu conversion facility are calculated by dividing water requirements for the facility (2.4 million l/yr) with that for No Action water requirements at each site: Hanford (13,511 million l/yr), NTS (2,400 million l/yr), INEL (7,570 million l/yr), Pantex (249 million l/yr), ORR (14,760 million l/yr), and SRS (13,247 l/yr).

[b] Percent increases in wastewater discharged during construction of a Pu conversion facility are calculated by dividing waste water discharges for the facility (2.4 million l/yr) with that for No Action water discharges at each site: Hanford (246 million l/yr), NTS (82 million l/yr), INEL (540 million l/yr), Pantex (141 million l/yr), ORR (2,277 million l/yr), and SRS (700 million l/yr).

[c] Percent changes in stream flow from wastewater discharges are calculated from the average flow of Clinch River (132 m^3/s) and East Fork Poplar Creek (1.5 m^3/s). The comparison for the East Fork Poplar Creek is shown in the table.

[d] Percent changes in stream flow from wastewater discharge are calculated from the minimum flow of the Fourmile Branch (0.16 m^3/s).

[e] Percent increases in water requirements during operation of a Pu conversion facility are calculated by dividing water requirements for the facility (80.5 million l/yr) with that for No Action water requirements at each site: Hanford (13,511 million l/yr), NTS (2,400 million l/yr), INEL (7,570 million l/yr), Pantex (249 million l/yr), ORR (14,760 million l/yr), and SRS (13,247 million l/yr).

[f] Percent increases in wastewater discharged during operation of a Pu conversion facility are calculated by dividing wastewater discharges for the facility (15.0 million l/yr) with that for No Action discharges at each site: Hanford (246 million l/yr), NTS (82 million l/yr), INEL (540 million l/yr), Pantex (141 million l/yr), ORR (2,277 million l/yr), and SRS (700 million l/yr).

Note: NA=not applicable; neg=negligible. Construction impacts are considered to be temporary, lasting only throughout the construction period. Impacts from operations would occur continuously.

Source: HF 1995a:1; INEL 1995a:1; LANL 1996c; NTS 1993a:4; OR LMES 1995e; PX 1995a:1; PX DOE 1995g; SRS 1995a:2.

sanitary and other wastewater would be discharged to a new wastewater treatment system. After treatment, all wastewater generated during construction and operation would be available for recycle.

Because there are no continuously flowing streams on NTS and no designated floodplains, there are no studies to assess the 500-year floodplain boundaries. Studies of the 100-year floodplain have shown it to be confined to the Jackass Flats and Frenchman Lake area. The site for the Pu conversion facility is not located in either of these areas. However, since the NTS is in a region where most flooding occurs from locally intense thunderstorms that can create brief (less than 6 hours) flash floods, the facility would be designed to withstand such flooding.

Groundwater. All water required for construction and operation would be supplied from groundwater. The Lower and Upper Carbonate, the Volcanic, and the Valley-Fill Aquifers are the sources of water for operations at NTS.

Water requirements for construction of the proposed facilities (2.4 million l/yr [0.6 million gal/yr]), represent approximately 0.006 percent of the minimum estimated annual recharge to the regional aquifer under the entire NTS. This is based on several recent studies that estimated that recharge would be 38 to 57 billion l (10 to 15 billion gal). As shown in Table 4.3.2.4–1, the quantity of water required for construction of the proposed facilities represents approximately a 0.1-percent increase over the total projected No Action groundwater usage. Withdrawal of this additional quantity should have minimal impact on groundwater availability. Operating the proposed facilities at NTS would require 80.5 million l/yr (21.2 million gal/yr) of water, which is approximately 3.4 percent of the projected groundwater usage. This additional withdrawal represents less than 0.2 percent of the estimated minimum annual recharge. No impacts are expected.

Construction and operation of the Pu conversion facility would not result in direct discharges to groundwater. Treated wastewater discharged to disposal ponds, however, could percolate downward toward the groundwater of the Valley-Fill Aquifer. This water would be monitored and would not be discharged until contaminant levels were within the limits specified. Impacts to groundwater quality are, therefore, not expected. In addition, other factors contributing to a lessening of potential impacts to groundwater are the combined effects of a deep water table, low discharge volumes, and high evaporation rates.

Idaho National Engineering Laboratory

Surface Water. No surface water would be withdrawn for any construction or operation activities associated with the facility; groundwater would be used as the water source for the Pu conversion facility. Therefore, there should be no impacts to surface water availability.

[Text deleted.]

During construction of the Pu conversion facility, sanitary wastewater (2.4 million l/yr [0.6 million gal]), would be generated and discharged to the existing wastewater treatment system at the ICPP Area. This amount would represent a 0.4-percent increase in the effluent discharged at INEL. During operation, approximately 15 million l/yr (4 million gal/yr) of sanitary and other wastewater would be discharged to this wastewater treatment system. This amount represents a 2.8-percent increase in INEL's effluent. After treatment, all wastewater generated during construction and operation would be available to recycle or would then be allowed to evaporate to the atmosphere and/or infiltrate to the subsurface. All discharges would be monitored to comply with discharge limits.

The site for the Pu conversion facility is not located in an area historically prone to flooding, but is within the flood zone that could occur as a result of the failure of the MacKay Dam during a maximum probable flood. This

flood event would be more critical than either the 100- or 500-year flood. Because INEL is in a region where flash floods could occur, the facility would be designed to withstand such flooding.

Groundwater. All water required for construction and operation would be supplied from groundwater from the Snake River Plain Aquifer. Construction water requirements for the Pu conversion facilities are small relative to INEL's total usage. Construction and operation water requirements for the facility (2.4 million l/yr [0.6 million gal/yr]), and 80.5 million l/yr (21.2 million gal/yr), respectively, represent 0.03- and 1.1-percent increases over the projected annual groundwater usage. These withdrawals would increase the total projected amount to be pumped at INEL to 17.6 percent of the total allotment during construction and 17.8 percent of the allotment during operation. As discussed in Section 3.4.4, a groundwater allotment not to exceed 43,000 million l/yr (11,360 million gal/yr), has been negotiated by DOE with the Idaho Department of Water Resources (DOE 1991c:4-73). These additional withdrawals should not impact groundwater availability.

Construction and operation of the proposed Pu conversion facility would not result in direct discharges to groundwater and would not be expected to contribute to existing near surface contamination. Treated wastewater that would be discharged to disposal ponds but does not evaporate, however, could percolate downward toward the groundwater of the Snake River Plain Aquifer. This water would be monitored and would not be discharged until contaminant levels were within the limits specified. Impacts to groundwater quality are, therefore, not expected. In addition, other factors contributing to a lessening of potential impacts to groundwater are the combined effects of a deep water table, low discharge volumes, and high evaporation rates.

Pantex Plant

Surface Water. No surface water would be withdrawn for any construction or operation activities associated with the proposed facility; groundwater would be used as the water source for the Pu conversion facility. Therefore, there would be no impacts to surface water availability.

[Text deleted.]

During construction of the Pu conversion facility, sanitary wastewater (2.4 million l/yr [0.6 million gal/yr]), would be generated and discharged to the existing wastewater treatment systems north of Zone 12. During operation, approximately 15 million l/yr (4 million gal/yr) of sanitary wastewater and other wastewater would be discharged to either of these wastewater treatment systems. After treatment, all wastewater generated during construction and operation would be discharged to the playa lakes or would be available for recycle. In 1994, Pantex averaged approximately 1.4 million l/day (0.37 million gal/day) of wastewater discharged to the playas. This quantity is expected to decrease in the future. The expected quantity of additional wastewater potentially discharged to the playas during operation (0.04 million l/day [0.01 million gal/day]) should not cumulatively cause any exceedances of the monthly average limit of 2.46 million l/day (0.65 million gal/day).

The new Pu conversion facility would be located in Zone 12. Since no 100-year, 500-year, or standard project flood boundaries have been delineated in Zone 12, there would be no impacts to flood plains. However, flooding at the playas could occur due to the runoff associated with precipitation and ponding in local playas (LLNL 1988a:XVI).

Groundwater. All water required for construction and operation would be supplied from groundwater using the existing supply system or possibly reclaimed wastewater from the Hollywood Road Wastewater Treatment Plant. Construction water requirements for the Pu conversion facilities are small relative to the recoverable water in aquifer storage which for the year 2010 was estimated to be 287 trillion l (76 trillion gal) (PX WDB 1993a:1). As shown in Table 4.3.2.4–1, construction of the proposed Pu conversion facility would require 2.4 million l/yr (0.6 million gal/yr) of water, which represents approximately a 1.0-percent increase over the projected annual groundwater usage. [Text deleted.] Water required for operations (80.5 million l/yr [21.2 million gal/yr]) would increase projected water requirements by 32.3 percent. Previous studies have

shown that when the Amarillo City Well Field pumped 18.5 billion l/yr (4.9 billion gal/yr) from the Ogallala Aquifer, an average of 1.8-m/yr (5.9-ft/yr) decline in the water table occurred over a 10-yr period in the local well field area. This water level decline caused a shift in the groundwater flow direction beneath Pantex. Operating the proposed Pu conversion facility at Pantex would require 80.5 million l/yr (21.2 million gal/yr), resulting in a small drawdown representing 4.2 percent of the capacity of the groundwater system. Although this additional groundwater withdrawal would add to the existing decline in water levels of the Ogallala Aquifer, the estimated degree would not affect regional groundwater levels. The total site groundwater withdrawal including this facility would be 329 million l/yr (86.9 million gal/yr) which, because of expected cutbacks in other programs, would be 61 percent less than the 836 million l/yr (221 million gal/yr) currently being withdrawn from wells at Pantex.

Construction and operation of the proposed Pu conversion facility would not result in direct discharges to groundwater. Treated wastewater discharged to playas, however, could percolate downward into the groundwater of the near surface aquifer. This water would be monitored and would not be discharged until contaminant levels were within the limits specified by the TNRCC. [Text deleted.]

Although the expected drawdowns caused by withdrawing the water required for this alternative is small, the overall decline in groundwater levels in the Amarillo are is of concern. Possible groundwater conservation measures at Pantex that could be considered including decreasing research farm irrigation demands through dry farming, installing dripless faucets, and process water reuse. In addition, to alleviate some of the effects from pumping groundwater from the Ogallala Aquifer, the city of Amarillo is considering supplying treated wastewater to Pantex from the Hollywood Road Wastewater Treatment Plant for industrial use. However, details of this measure have not been determined.

Oak Ridge Reservation

Surface Water. Water required for construction and operation of the Pu conversion facility would be provided via existing distribution systems. The source of this water is the Clinch River and its tributaries. Water requirements during construction (2.4 million l/yr [0.6 million gal/yr]) and operation (80.5 million l/yr [21.2 million gal/yr]) would represent a 0.02-percent and 0.6-percent increase respectively in the projected annual surface water withdrawal. These additional water withdrawals from the Clinch River should cause negligible impacts to surface water availability.

During construction of the Pu conversion facility, sanitary wastewater (approximately 2.4 million l/yr [0.6 million gal/yr]) would be generated and discharged to the existing wastewater treatment system in the Y–12 area. This would cause a 0.1-percent increase in the effluent from this facility. During operation, a total of 15 million l/yr (3.9 million gal/yr) of wastewater would be generated by the new facilities. This would cause a 0.7-percent increase in the effluent discharged from the Y–12 area. All discharges would be monitored to comply with discharge requirements. Minimal impacts would be expected.

Since the potential site for the Pu conversion facility would be located outside both the 500- and 100-year floodplains, there would be no impacts to floodplains.

Groundwater. No groundwater would be used for any project-related water requirements and no wastewater would be discharged directly to groundwater; therefore, neither groundwater quality nor availability would be affected.

Savannah River Site

Surface Water. No surface water would be used for project requirements during construction and operation of the Pu conversion facility. [Text deleted.]

During construction of the Pu conversion facility, sanitary wastewater (2.4 million l/yr [0.6 million gal/yr]) would be generated and discharged to the sitewide wastewater treatment system, which would not require any modifications. This amount would represent a 0.3-percent increase in the estimated annual flow to this facility and could be handled within the existing capacity. During operation, a total of 15 million l/yr (3.9 million gal/yr) of wastewater would be generated by the new facility, representing a 2.1-percent increase. [Text deleted.]

The potential location of the Pu conversion facility would be located outside the 100-year floodplain. Information on the location of the 500-year floodplain at SRS is only available for a limited number of project areas. However, the Pu Conversion facility at SRS would not likely affect, or be affected by the 500-year floodplain of either the Fourmile Branch or Upper Three Runs Creek because the facility would be located at an elevation of about 91 m (300 ft) above MSL and is approximately 33 m (107 ft) and 64 m (210 ft) above these streams and at distances from these streams of 0.8 km (0.5 mi) to 1.5 km (0.94 mi), respectively. The maximum flow that has occurred on the Upper Three Runs Creek was in 1990, with a flow rate of about 58 m^3/s (2,040 ft^3/s). At that time the creek reached an elevation of almost 30 m (98 ft) above MSL (SR USGS 1996a:1). The elevations of the buildings in F-Area are more than 62 m (202 ft) above the highest flow elevation of the Upper Three Runs Creek. The maximum flow that has occurred on the Fourmile Branch was in 1991 with a rate of approximately 5 m^3/s (186 ft^3/s), and an elevation of about 61 m (199 ft) above MSL (SR USGS 1996a:1). Elevations of the buildings in F-Area are more than approximately 31 m (101 ft) higher than the maximum flow level that has occurred.

Groundwater. During construction, the quantity of water required would be approximately 2.4 million l/yr (0.6 million gal/yr), which would represent a 0.02-percent increase over the existing projected annual ground water withdrawal. During operation, water requirements would be approximately 80.5 million l/yr (21.2 million gal/yr), which would represent a 0.6-percent increase in ground water withdrawals. Minimal impacts to groundwater availability are expected.

No wastewater would be discharged directly to groundwater; therefore, groundwater quality would not be affected.

[Text deleted.]